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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,380	07/29/2003	Dong Han Seo	LT-0037	4334

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EXAMINER

TRAN, CON P

ART UNIT PAPER NUMBER

2615

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/628,380	Applicant(s) SEO ET AL.	
	Examiner Con P. Tran	Art Unit 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 5-8, 10-14, 16, 18, 19 and 27-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5, 13, 14, 16, 18, 19, 27 and 29 is/are rejected.
- 7) ☒ Claim(s) 6-8, 10-12, 28, 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figures 2-7 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claim 5** is rejected under 35 U.S.C. 102(e) as being anticipated by O'Brien U.S. Patent 6,429,737 (hereinafter, "O'Brien' 737").

Regarding **claim 5**, O'Brien' 737 teaches a multi-channel PWM (Pulse Width Modulator) apparatus (see col. 3, line 63 – col. 4, line 9; see Figs. 1, 7, and respective portions of the specification), comprising:

a plurality of pulse width modulation means (PWM 119, Figs. 1, 7) for modulating audio signals (112, 70, 71, Figs. 1, 7) into PWM-based multi-channel audio signals (outputs of PWMs; col. 3, lines 8-15; col. 5, lines 39-48); and

gain control means (volume control 114, Fig. 1) connected to the plurality of pulse width modulation (119, Fig. 1; PWM, Fig. 7) for receiving the audio signals received at the plurality of pulse width modulation means, wherein the gain control means independently controls gains of the received audio signals according to individual channels (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls).

O'Brien' 737 thus discloses all the claimed limitations.

4. **Claims 13-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. U.S. Patent 7,047,325 (hereinafter, "Kondo") in view of O'Brien U.S. Patent 6,429,737 (hereinafter, "O'Brien' 737").

Regarding **claim 13**, Kondo teaches an audio/visual receiver (DVD, VCR, tuner, monitor; col. 7, lines 49-56; see Figs. 18, 22, 38, and respective portions of the specification), comprising:

a reader (DVD player 96A, Fig. 38) configured to output a first data signal based on information stored in a recording medium (col. 42, lines 13-21);

a tuner (61, Fig. 18) configured to output a second data signal (col. 27, lines 34-40);

a decoder (81, Fig. 22) coupled to the reader configured to decode the data signals into audio signals (col. 31, lines 9-18);

at least one speaker (306, Fig. 42) configured to receive and output the PWM-based multi-channel audio signals (see col. 44, lines 45-51).

However, Kondo does not explicitly disclose a pulse width modulator device configured to modulate the audio signals into PWM-based multi-channel audio signals that comprises, a plurality of pulse width modulators configured to modulate the audio signals into the PWM-based multi-channel audio signals; and a plurality of signal controllers coupled to the plurality of modulators to independently control at least one of input signals and output signals of the plurality of pulse width modulators.

O'Brien' 737 teaches a pulse width modulator device configured to modulate the audio signals into PWM-based multi-channel audio signals (see col. 3, line 63 – col. 4, line 9; see Figs. 1, 7, and respective portions of the specification), that comprising:

a plurality of pulse width modulation means (PWM 119, Figs. 1, 7) for modulating audio signals (112, 70, 71, Figs. 1, 7) into PWM-based multi-channel audio signals (outputs of PWMs; col. 3, lines 8-15; col. 5, lines 39-48); and

a plurality of signal controllers (via volume control 114, Fig. 1) coupled to the plurality of modulators to independently control at least one of input signals and

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output signals of the plurality of pulse width modulators (col. 2, lines 8-39), wherein the plurality of signal controllers comprise a plurality of gain controllers (via volume control 114, Fig. 1) that each receive one of the audio signals received for a corresponding one of the plurality of pulse width modulators (PWM 119, see Figs. 1, 7), wherein the gain controllers independently control gains of the received audio signals according to individual channels (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a pulse width modulator of O'Brien' 737 device teaching with an audio/visual receiver of Kondo to obtain a an audio/visual receiver as claimed for purpose of reducing or eliminating noise that leak from one channel to another, as suggested by O'Brien' 737 in column 4, lines 63-67.

Regarding **claim 14**, O'Brien' 737, as modified, further teaches wherein the plurality of signal controllers comprise a plurality of phase shifters that phase-shift modulated output signals received from the pulse width modulators (delay timing control 120 for each PWM 119, Figs. 1, 7; col. 3, lines 16-22).

5. **Claims 16, 18, 19, 27, and 29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo et al. U.S. Patent 7,047 (hereinafter, "Kondo") in view of O'Brien U.S. Patent 6,429,737 (hereinafter, "O'Brien' 737"), and further in view of Beard U.S. Patent 5,796,359.

Regarding **claim 16**, Kondo in view of O'Brien teaches the receiver of claim 14.

However, Kondo in view of O'Brien does not explicitly disclose wherein the plurality of signal controllers comprising a plurality of controllers that independently enable the plurality of pulse width modulators according to individual channels.

Beard discloses a data conversion system (10, 50, Figs. 1, 2) having pulse width modulation (24) in which the control circuitry (40) selectively disables the pulse-width modulator (24, col. 2, lines 45-52; col. 5, lines 41-48; col. 6, lines 30-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a control circuitry of Beard teaching with a receiver of Kondo in view of O'Brien' 737 to obtain a control means for independently turning on/off the plurality of pulse width modulation means according to individual channels as claimed for purpose of providing a lower costs solution to data conversion and data processing than was otherwise available, as suggested by Beard in column 2, lines 43-45.

Regarding **claim 18**, this claim has similar limitations as Claim 16. Therefore it is interpreted and rejected for the reasons set forth in the rejection of Claim 16.

Regarding **claim 19**, O'Brien' 737 teaches a multi-channel PWM (Pulse Width Modulator) apparatus (see col. 3, line 63 – col. 4, line 9; see Figs. 1, 7, and respective portions of the specification), comprising:

a plurality of pulse width modulators (PWM 119, Figs. 1, 7) configured to modulate audio signals (112, 70, 71, Figs. 1, 7) into PWM-based multi-channel audio signals (outputs of PWMs; col. 3, lines 8-15; col. 5, lines 39-48); and

a plurality of signal controlling means (via volume control 114, Fig. 1) coupled to the plurality of modulators for controlling at least one of input signals and output signals of the plurality of pulse width modulators (col. 2, lines 8-39), wherein the plurality of signal controlling means comprise a plurality of phase shifting means for phase-shifting modulated output signals received from the pulse width modulation (delay timing control 120 for each PWM 119, Figs. 1, 7; col. 3, lines 16-22), wherein the plurality of signal controlling means comprise a plurality of gain control means (i.e., controller, via volume control 114, Fig. 1) for receiving the audio signals received at the plurality of pulse width modulators (PWM 119, see Figs. 1, 7), wherein the gain control means independently controls gains of the received audio signals according to individual channels of the pulse width modulators (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls), wherein the plurality of signal controlling means comprise a plurality of control means for independently control the plurality of pulse width modulators according to said individual channels, while audio signals are being received at said PWM apparatus (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls).

However, O'Brien' 737 does not explicitly disclose wherein control means for

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independently turning on/off the plurality of pulse width modulation means according to individual channels.

Beard discloses a data conversion system (10, 50, Figs. 1, 2) having pulse width modulation (24) in which the control circuitry (40) selectively disables the pulse-width modulator (24, col. 2, lines 45-52; col. 5, lines 41-48; col. 6, lines 30-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a control circuitry of Beard teaching with an apparatus of O'Brien' 737 to obtain a control means for independently turning on/off the plurality of pulse width modulation means according to individual channels as claimed for purpose of providing a lower costs solution to data conversion and data processing than was otherwise available, as suggested by Beard in column 2, lines 43-45.

Regarding **claim 27**, Kondo teaches an audio/visual receiver (DVD, VCR, tuner, monitor; col. 7, lines 49-56; see Figs. 18, 22, 38, and respective portions of the specification), comprising:

- a reader (DVD player 96A, Fig. 38) configured to output a first data signal based on information stored in a recording medium (col. 42, lines 13-21);

- a tuner (61, Fig. 18) configured to output a second data signal (col. 27, lines 34-40);

- a decoder (81, Fig. 22) coupled to the reader configured to decode the data signals into audio signals (col. 31, lines 9-18);

at least one speaker (306, Fig. 42) configured to receive and output the PWM-based multi-channel audio signals (see col. 44, lines 45-51).

However, Kondo does not explicitly disclose a pulse width modulator device configured to modulate the audio signals into PWM-based multi-channel audio signals that comprises, a plurality of pulse width modulators configured to modulate the audio signals into the PWM-based multi-channel audio signals; and a plurality of signal controllers coupled to the plurality of modulators to independently control at least one of input signals and output signals of the plurality of pulse width modulators.

O'Brien' 737 teaches a pulse width modulator device configured to modulate the audio signals into PWM-based multi-channel audio signals (see col. 3, line 63 – col. 4, line 9; see Figs. 1, 7, and respective portions of the specification), that comprising:

a plurality of pulse width modulation means (PWM 119, Figs. 1, 7) for modulating audio signals (112, 70, 71, Figs. 1, 7) into PWM-based multi-channel audio signals (outputs of PWMs; col. 3, lines 8-15; col. 5, lines 39-48); and

a plurality of signal controllers (via volume control 114, Fig. 1) coupled to the plurality of modulators to independently control at least one of input signals and output signals of the plurality of pulse width modulators (col. 2, lines 8-39), wherein the plurality of signal controllers comprise a plurality of gain controllers (via volume control 114, Fig. 1) that each receive one of the audio signals received for a corresponding one of the plurality of pulse width modulators (PWM 119, see Figs. 1, 7), wherein the gain controllers independently control gains of the received audio signals according to

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individual channels (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a pulse width modulator of O'Brien' 737 device teaching with an audio/visual receiver of Kondo to obtain a an audio/visual receiver as claimed for purpose of reducing or eliminating noise that leak from one channel to another, as suggested by O'Brien' 737 in column 4, lines 63-67.

However, Kondo in view of O'Brien does not explicitly disclose wherein the plurality of signal controllers comprising a plurality of controllers that independently enable the plurality of pulse width modulators according to individual channels.

Beard discloses a data conversion system (10, 50, Figs. 1, 2) having pulse width modulation (24) in which the control circuitry (40) selectively disables the pulse-width modulator (24, col. 2, lines 45-52; col. 5, lines 41-48; col. 6, lines 30-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a control circuitry of Beard teaching with a receiver of Kondo in view of O'Brien' 737 to obtain a control means for independently turning on/off the plurality of pulse width modulation means according to individual channels as claimed for purpose of providing a lower costs solution to data conversion and data processing than was otherwise available, as suggested by Beard in column 2, lines 43-45.

Regarding **claim 29**, Kondo in view of O'Brien and further in view of Beard teaches the receiver of claim 27. O'Brien' 737 as modified further teaches wherein the plurality of signal controllers (via volume control 114, Fig. 1) comprise a plurality of gain controllers (volume control 114, Fig. 1) that receive one of the audio signals received at a corresponding one of the plurality of pulse width modulators (PWM 119, Figs. 1, 7; col. 3, lines 8-15; col. 5, lines 39-48), wherein the gain controllers independently control gains of the received audio signals according to individual channels (col. 2, lines 8-39; volume control controls gains of each channel by itself, i.e., independently controls although not individually controls).

Allowable Subject Matter

6. Claims 6, 28, and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 7-8, and 10-12 are objected by virtue of their dependency on claim 6.

Conclusion

7. Applicants' amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Con P. Tran whose telephone number is (571) 272-7532. The examiner can normally be reached on M - F (8:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Vivian C. Chin can be reached on (571) 272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should


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cpt CPJ
March 19, 2007


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